

Application No. 10/552,410
Paper Dated: May 4, 2009
In Reply to USPTO Correspondence of December 3, 2008
Attorney Docket No. 1217-052834

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 8. The deleted labels have been circled on the Annotated Sheet. This sheet, which includes Figs. 8, 9(a) and 9(b), replaces the original sheet including Figs. 8, 9(a) and 9(b).

Attachment: Annotated Sheet (1)
Replacement Sheet (1)

REMARKS

Claims 1-12, 14-23 and 27 are pending in the application. Claims 1-7, 12, 14-21 and 27 are withdrawn from consideration pursuant to a previously imposed restriction requirement and subsequent election of claims 8-11, 13 and 22-26. Applicant respectfully requests reconsideration in light of the amendments made herein taken with the following remarks. Claims 8-11, 22 and 23 have been amended and claims 13 and 24-26 have been cancelled by way of this Amendment. Accordingly, claims 8-11, 22 and 23 are currently pending for purposes of examination, and claim 8 is in independent form. Support for the amendments can be found, for example, in Figs. 7 and 8, page 1, lines 13-20 of the specification, page 21, line 8 to page 24, line 7 of the specification, and in original claims 1-13. Applicant respectfully submits that no new matter has been presented by way of the Amendment.

New Matter Objections:

The prior Amendment, filed on September 19, 2008, including the amendments to the claims, specification and drawings set forth therein, has been objected to for the presentation of new matter.

The claims, specification and drawings have been amended by way of this Amendment to delete references to the moving mechanisms identified in the Office Action as being new matter. Applicant respectfully requests that the objections be withdrawn.

Rejection Under 35 U.S.C. §112, first paragraph:

Claims 8-11, 13 and 22-26 stand rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the written description requirement. The limitations of “a mechanism for moving the fixing roll across the frame member” and “a mechanism for moving the sticking roll within the perimeter of said frame member,” identified in the Office Action as not being supported by Applicant’s disclosure, have been deleted from claim 8. Applicant respectfully requests that the rejection be withdrawn.

Rejections Under 35 U.S.C. §103(a):

Claims 8-10, 13, 24 and 25 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 5,328,546 to Brady et al. (hereinafter "Brady") in view of U.S. Application Publication No. 2003/0133762 to Yamamoto et al. (hereinafter "Yamamoto") and U.S. Patent No. 6,715,524 to Chen et al. (hereinafter "Chen"). Claims 11, 22, 23 and 26 stand rejected under 35 U.S.C. §103(a) for obviousness over Brady in view of Yamamoto and Chen, and in further view of U.S. Patent No. 6,080,263 to Saito et al. (hereinafter "Saito"). In view of the foregoing amendments and the following remarks, reconsideration and withdrawal of these rejections are respectfully requested.

The present invention relates to a method and apparatus for sticking a tape to a semiconductor wafer to protect circuits formed on the surface of the wafer. More particularly, the invention relates to a method and apparatus capable of preventing the warpage of a thin semiconductor wafer having a circuit imprinted thereon, to which a protective tape has been stuck.

Specifically, pre-cut protective tapes 12 are attached to a long support film 10, and the support film 10 is attached to frame member 18 at positions where the pre-cut protective tape 12 to be stuck to a semiconductor wafer 14 is positioned within the frame member 18. The support film 10 is pressed to stick the pre-cut protective tape 12 to the semiconductor wafer 14, and the support film 10 is released from the tape 12. The long support film 10 is under tension, but this tension is decreased with respect to the pre-cut, spaced-apart protective tapes 12 when the support film 10 is attached to the frame member 18.

Accordingly, the pre-cut protective tape 12 stuck to the semiconductor wafer has reduced residual stress, and the thin semiconductor wafer to which the tape 12 has been stuck, is free from warpage, which would otherwise be caused by a protective tape applied under tension.

Additionally, the protective tape 12 is pre-cut to approximately the shape of the semiconductor wafer. Therefore, the pre-cutting prevents the cutter from damaging the outer peripheral edge of the wafer, which is a problem in the prior art.

Independent claim 8 has been amended to clarify that the apparatus for sticking tape protects circuits formed on a surface of a semiconductor wafer and to specify that the

adherend is a semiconductor wafer.

Brady teaches a photo resist film application mechanism for applying a layer of dry film resist (18) to a semiconductor wafer (72). In particular, Brady discloses a tape transport assembly (44) at one point being positioned over a laminating assembly (71). A semiconductor wafer (72) is positioned within a heated vacuum chuck assembly (74). A pre-cut portion of laminate (14), disposed on a transport tape (40), is then applied to the wafer (72) by a lamination roller (46), which presses the laminate (14) onto the wafer (72). Please note Figs. 1A-B, 2D and 5, and column 5, lines 3-39 of Brady.

Yamamoto teaches that a ring frame (f) is adhered to a section of dicing tape (DT) by an applicator roller (22). A section of the dicing tape (DT) with the ring frame (f) applied to it is then cut away from the roll. This section is moved away by a ring frame lift mechanism (26), which attaches to the ring frame (f) by vacuum. A chuck table (15) carrying a semiconductor wafer (W) is then aligned within the ring frame lift mechanism (26) and another applicator roller (28) moves within the interior perimeter of the ring frame (f) and ring frame lift mechanism (26) to apply the dicing tape (DT) to a surface of the wafer (W) so as to form a mount frame (MF) for the wafer (W). Please note Figs. 1 and 6-15 and paragraphs [0119]-[0165] appearing on pages 5-8 of the Yamamoto application.

Chen teaches a laminating system for applying a dry resist layer (3) to a substrate (36). In particular, Chen teaches a laminating head (24) that traverses across the length of the substrate (36) in order to apply a strip of laminate tape (1) having a support film (4) disposed over a layer of dry resist material (3) to the surface of the substrate (36) by pressing the laminate tape (1) onto the substrate (36). Please note Fig. 4, column 5, lines 1-23 and column 6, lines 2-11 of Chen.

Saito teaches an apparatus for applying a protecting film to a semiconductor wafer wherein a press roller (107) is used to apply the protective film (109) to the wafer (W) disposed on a mounting table (201). The mounting table (201) is movable to align the position of the wafer (W) with respect to the press roller (107) and the rest of the apparatus. Please note Figs. 1-8 and column 3, line 1 to column 7, line 28 of Saito.

Applicant submits that Brady, Yamamoto, Chen and Saito, taken separately or in combination, fail to teach or suggest the above-mentioned claimed subject matter of claim 8, as amended.

Brady teaches an apparatus for sticking a dry photo resist film to a semiconductor wafer. As such, the apparatus taught by Brady is used before circuits are formed on the surface of a semiconductor wafer. Brady does not teach or suggest that the apparatus applies a protective tape to the surface of the semiconductor wafer to protect a circuit formed thereon.

Before circuits are formed on the surface of a semiconductor wafer, there is no factor that causes warpage of the semiconductor wafer. Rather, warpage of the wafer is caused by the protective tape stuck to the wafer after back-grinding. As such, one of ordinary skill in the art would see no benefit or motivation to modify the apparatus taught by Brady to include the claimed frame member, fixing roll having a width greater than the interior width of the frame member, and sticking roll having a width less than the interior width of the frame member since the application of a dry photo resist to a semiconductor wafer prior to imprinting of a circuit onto a surface of the wafer and subsequent back-grinding of the wafer will not cause warpage of the semiconductor wafer.

Furthermore, combining the frame member and the roller taught by Yamamoto with the apparatus taught by Brady would hinder the operation of the apparatus taught by Brady and render the apparatus unsuitable for intended purpose. Such a combination would result in an obstruction to the effective application of the dry photo resist film on the surface of the semiconductor wafer. As such, one of ordinary skill in the art would not combine the frame member taught by Yamamoto with the apparatus taught by Brady as doing so is unnecessary to prevent warpage of the wafer and would disrupt operation of the apparatus taught by Brady. Yamamoto, therefore, fails to fairly suggest a modification to the apparatus taught by Brady that achieves the claimed invention.

Chen is cited for the teaching of a sticking roll for applying a laminate tape having a support film disposed over a layer of dry resist material to the surface of a substrate. Saito is cited for the teaching of an alignment mechanism to align a mounting table with an application mechanism. Neither Chen nor Saito teach or suggest an apparatus that applies a

protective tape to the surface of a semiconductor wafer to protect a circuit formed thereon. Rather, Saito and Chen, like Brady, each relate to an apparatus for applying protective laminates and films to a wafer prior to imprinting of a circuit onto a surface of the wafer and subsequent back-grinding of the wafer. Warpage of the wafer during these processes is therefore not a concern and not addressed by the teachings of Chen and Saito. Chen and Saito, therefore, fail to fairly suggest a modification to the apparatus taught by Brady that achieves the claimed invention.

Applicant submits that claim 8, as amended, is allowable for at least the foregoing reasons, as the teachings of the prior art of record, including Yamamoto, Chen and Saito, are not sufficient to overcome the deficiencies in the teachings of Brady with respect to claim 8.

Claims 9-11, 22 and 23 are dependent upon and add further limitations to independent claim 8, and are allowable for at least the same reasons discussed above in connection with claim 8.

Conclusion:

For the foregoing reasons, the Examiner's reconsideration and favorable action regarding claims 8-11, 22 and 23 are respectfully requested.

Respectfully submitted,
THE WEBB LAW FIRM

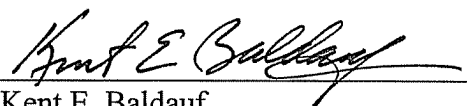
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Fig.8

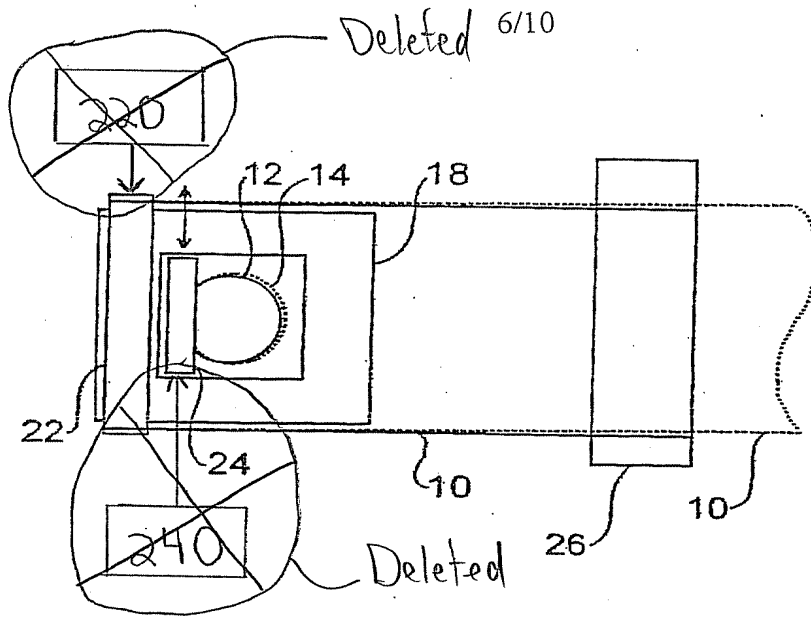


Fig.9

